

AMENDMENTS TO THE CLAIMS

Please cancel Claims 44-60 and 84-86 as set forth below.

Please amend Claim 88 as set forth below.

1. **(Previously Presented)** An intravascular extracardiac pumping system for increasing perfusion of tissue of a patient through a renal artery, the system comprising:

a pump configured to pump blood through the patient at subcardiac volumetric rates, said pump having an average flow rate that, during normal operation thereof, is substantially below that of the patient's heart when healthy, the pump configured to be positioned within the vasculature of a patient; and

a pump housing having:

an inflow portion defining an axis, the inflow portion fluidly coupled to the pump to direct blood to the pump, the inflow portion configured to be positioned within the vasculature of the patient; and

an outflow portion extending generally laterally from the axis of the inflow portion, the outflow portion fluidly coupled to the pump to direct blood away from the pump, the outflow portion configured to be at least partially positioned within the renal artery of the patient;

a positioning member having a distal end, a proximal end, and a body extending therebetween, the distal end coupled with the pump to generally maintain the position of the pump relative to a point of access to the vasculature, the body having a length such that the proximal end is located outside the vasculature in use;

whereby the pump, the positioning member, and the inflow and outflow portions are configured so as to be inserted subcutaneously into the vasculature in a minimally-invasive procedure.

2. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the inflow portion is configured to extend to a location midstream the renal artery and the heart of the patient when applied to the patient.

3. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the inflow portion is configured to extend to a vascular location proximate the aortic arch of the patient when applied to the patient.

4. **(Withdrawn)** The intravascular extracardiac pumping system of Claim 1, wherein the inflow portion comprises an inlet end configured to extend to a location midstream the renal artery and a femoral artery when applied to the patient.

5. **(Withdrawn)** The intravascular extracardiac pumping system of Claim 1, wherein the inflow portion comprises an inlet end configured to extend to a vascular location within an iliac artery when applied to the patient.

6. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the pump is configured to be positioned at a location midstream the heart of the patient and the renal artery.

7. **(Original)** The intravascular extracardiac pumping system of Claim 6, wherein the pump is configured to direct blood in generally the same direction as the blood flowing adjacent the pump and outside the system.

8. **(Withdrawn)** The intravascular extracardiac pumping system of Claim 1, wherein the pump is configured to be positioned at a location midstream the renal artery and a femoral artery of the patient.

9. **(Withdrawn)** The intravascular extracardiac pumping system of Claim 8, wherein the pump is configured to direct blood generally counter to the direction of the blood flowing adjacent the pump and outside the system.

10. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the outflow portion comprises a first portion and a second portion, the first portion of the outflow portion configured to extend proximally from the pump to a location adjacent the renal artery and the second portion of the outflow portion configured to extend from the first portion of the outflow portion into the renal artery.

11. **(Original)** The intravascular extracardiac pumping system of Claim 10, wherein the first portion of the outflow portion extends generally perpendicularly to the second portion of the outflow portion.
12. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the pump is a rotary pump.
13. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the pump is configured to operate in pulsatile fashion.
14. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the pump comprises an impeller.
15. **(Original)** The intravascular extracardiac pumping system of Claim 14, wherein the impeller is helically shaped.
16. **(Original)** The intravascular extracardiac pumping system of Claim 14, wherein the impeller is driven mechanically by a motor through a drive wire.
17. **(Original)** The intravascular extracardiac pumping system of Claim 14, wherein the impeller is driven electromagnetically by a discrete electromagnetic drive.
18. **(Original)** The intravascular extracardiac pumping system of Claim 17, wherein the electromagnetic drive is sized and configured to be implantable.
19. **(Original)** The intravascular extracardiac pumping system of Claim 18, wherein the electromagnetic drive is sized and configured to be implantable within the patient's vasculature.
20. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the pump comprises a rotatable cable having means for directing blood axially along the cable.
21. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the pump comprises an Archimedes screw.

22. **(Original)** The intravascular extracardiac pumping system of Claim 1, further comprising a pump driving means.

23. **(Original)** The intravascular extracardiac pumping system of Claim 22, wherein the pump driving means is sized and configured to be implantable.

24. **(Original)** The intravascular extracardiac pumping system of Claim 23, wherein the pump driving means is sized and configured to be implantable within the vasculature of a patient.

25. **(Original)** The intravascular extracardiac pumping system of Claim 22, wherein the pump driving means comprises a drive wire.

26. **(Original)** The intravascular extracardiac pumping system of Claim 22, wherein the pump driving means further comprises a motor.

27. **(Original)** The intravascular extracardiac pumping system of Claim 22, wherein the pump driving means comprises an electromagnetic drive.

28. **(Original)** The intravascular extracardiac pumping system of Claim 1, wherein the outflow portion comprises a first outflow portion and further comprising a second outflow portion, the first outflow portion being configured to be positioned within the renal artery and the second outflow portion being configured to be positioned within an artery of the patient.

29. **(Original)** The intravascular extracardiac pumping system of Claim 28, wherein the second outflow portion is configured to be positioned within an iliac artery of the patient.

30. **(Original)** The intravascular extracardiac pumping system of Claim 28, wherein the second outflow portion is configured to be positioned within a branch artery of the patient.

31. **(Original)** The intravascular extracardiac pumping system of Claim 28, wherein the second outflow portion is configured to be positioned within the renal artery of the patient.

32. **(Original)** The intravascular extracardiac pumping system of Claim 28, wherein the first outflow portion is configured to be positioned in a first renal artery and the second outflow portion is configured to be positioned in a second renal artery.

33. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 28, wherein the first outflow portion comprises a first portion and a second portion, the first portion of the first outflow portion configured to extend between the pump and a vascular location adjacent the renal artery and the second portion of the first outflow portion configured to extend from the first portion of the first outflow portion into the renal artery.

34. **(Original)** The intravascular extracardiac pumping system of Claim 33, wherein the first portion of the first outflow portion extends generally perpendicularly to the second portion of the first outflow portion.

35. **(Withdrawn)** The intravascular extracardiac pumping system of Claim 33, wherein the second outflow portion comprises a first portion and a second portion, the first portion of the second outflow portion configured to extend from the pump to a vascular location adjacent the artery and the second portion of the second outflow portion configured to extend from the first portion of the second outflow portion into the artery.

36. **(Withdrawn)** The intravascular extracardiac pumping system of Claim 35, wherein the renal artery comprises a first renal artery and the artery comprises a branch artery.

37. **(Withdrawn)** The intravascular extracardiac pumping system of Claim 35, wherein the renal artery comprises first renal artery and the artery comprises a second renal artery.

38. **(Withdrawn)** The intravascular extracardiac pumping system of Claim 35, wherein the first portion of the second outflow portion extends generally perpendicularly to the second portion of the second outflow portion.

39. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 1, wherein the outflow portion comprises a first portion configured to extend from the pump to a

first location adjacent the renal artery, a second portion configured to extend from the first portion into the renal artery, and a third portion configured to extend from the first portion into an artery.

40. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 39, wherein the third portion is configured to extend into an iliac artery.

41. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 39, wherein the third portion is configured to extend into a branch artery.

42. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 39, wherein the third portion is configured to extend into the renal artery.

43. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 39, wherein the first location is adjacent a first renal artery, the renal artery comprises a first renal artery, and the third portion is configured to extend into a second renal artery.

44. **(Cancelled)**

45. **(Cancelled)**

46. **(Cancelled)**

47. **(Cancelled)**

48. **(Cancelled)**

49. **(Cancelled)**

50. **(Cancelled)**

51. **(Cancelled)**

52. **(Cancelled)**

53. **(Cancelled)**

54. (Cancelled)

55. (Cancelled)

56. (Cancelled)

57. (Cancelled)

58. (Cancelled)

59. (Cancelled)

60. (Cancelled)

61. **(Withdrawn)** A method for treating a patient without connecting any component to the patient's heart, the method comprising the steps of:

inserting an inlet end of an inflow portion of an intravascular pumping system into the vasculature of a patient using a minimally invasive surgical procedure, the intravascular pumping system comprising a pump coupled with the inflow portion and an outflow portion coupled with the pump;

advancing the intravascular pumping system within the vasculature until the inlet end of the inflow portion is positioned at a first location within an artery and an outlet end of the outflow portion is positioned within a renal artery; and

operating said pump to pump blood through the renal artery to perfuse tissue at volumetric rates that are on average subcardiac.

62. **(Withdrawn)** The method of Claim 61, wherein advancing the intravascular pumping system further comprises advancing the inlet end of the inflow portion to a location adjacent the aortic arch.

63. **(Withdrawn)** The method of Claim 61, wherein advancing the intravascular pumping system further comprises advancing the inlet end of the inflow portion to a location adjacent the renal artery.

64. **(Withdrawn)** The method of Claim 63, wherein advancing the intravascular pumping system further comprises advancing the inlet end of the inflow portion to a location midstream the renal artery and the heart.

65. **(Withdrawn)** The method of Claim 64, wherein advancing the intravascular pumping system further comprises advancing the inlet end of the inflow portion to a location midstream the renal artery and a femoral artery.

66. **(Withdrawn)** The method of Claim 61, wherein advancing the intravascular pumping system further comprises advancing the inlet end of the inflow portion to a location adjacent a femoral artery.

67. **(Withdrawn)** The method of Claim 61, wherein advancing the intravascular pumping system further comprises advancing the inlet end of the inflow portion to a location within a femoral / iliac artery.

68. **(Withdrawn)** The method of Claim 61, wherein advancing the intravascular pumping system further comprises positioning the outlet end of the outflow portion within a renal artery.

69. **(Withdrawn)** The method of Claim 61, wherein the outflow portion comprises a first outflow portion, the outlet end comprises a first outlet end of the first outflow portion, and further comprising a second outflow portion having a second outlet end, and wherein advancing the intravascular pumping system further comprises positioning the first outlet end in the renal artery and positioning the second outlet end in an artery.

70. **(Withdrawn)** The method of Claim 69, wherein advancing the intravascular pumping system further comprises positioning the first outlet end in the renal artery and positioning the second outlet end in an artery.

71. **(Withdrawn)** The method of Claim 70, wherein advancing the intravascular pumping system further comprises positioning the second outlet end in a branch artery.

72. **(Withdrawn)** The method of Claim 70, wherein advancing the intravascular pumping system further comprises positioning the second outlet end in the renal artery.

73. **(Withdrawn)** The method of Claim 70, wherein advancing the intravascular pumping system further comprises positioning the first outlet end in a first renal artery and positioning the second outlet end in a second renal artery.

74. **(Withdrawn)** The method of Claim 61, wherein the outflow portion comprises a first portion extending from the pump, a second portion extending from the first portion to a first outlet end, and a third portion extending from the first portion to a second outlet end.

75. **(Withdrawn)** The method of Claim 74, wherein advancing the intravascular pumping system further comprises positioning the first outlet end in the renal artery and positioning the second outlet end in an artery.

76. **(Withdrawn)** The method of Claim 75, wherein advancing the intravascular pumping system further comprises positioning the second outlet end in a branch artery.

77. **(Withdrawn)** The method of Claim 75, wherein advancing the intravascular pumping system further comprises positioning the second outlet end in the renal artery.

78. **(Withdrawn)** The method of Claim 75, wherein advancing the intravascular pumping system further comprises positioning the first outlet end in a first renal artery and positioning the second outlet end in a second renal artery.

79. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 1, wherein the positioning member has a low-profile structure.

80. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 1, wherein the positioning member has sufficient axial stiffness to advance the pump and the pump housing through skin of the patient at a percutaneous insertion site.

81. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 1, wherein the positioning member comprises a lumen.

82. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 81, wherein the lumen is configured to house a portion of the pump.

83. **(Previously Presented)** The intravascular extracardiac pumping system of Claim 81, wherein the pump comprises a drive wire that extends through the lumen of the positioning member.

84. **(Cancelled)**

85. **(Cancelled)**

86. **(Cancelled)**

87. **(Previously Presented)** An intravascular extracardiac pumping system for increasing perfusion of tissue of a patient through a renal artery, the system comprising:

- a pump configured to be positioned within the vasculature of a patient and configured to pump blood through the patient at subcardiac volumetric rates; and

- a pump housing having:

- an inflow portion defining an inflow axis, the inflow portion fluidly coupled to the pump to direct blood to the pump, the inflow portion configured to be positioned within the vasculature of the patient;

- a first outflow portion extending laterally from the inflow axis, the first outflow portion fluidly coupled to the pump to direct blood away from the pump, the first outflow portion configured to be at least partially positioned within a first renal artery of the patient; and

- a second outflow portion extending laterally from the inflow axis and generally opposite the first outflow portion, the second outflow portion fluidly coupled to the pump to direct blood away from the pump, the second outflow portion configured to be at least partially positioned within a second renal artery of the patient;

whereby the pump and the inflow and outflow portions are configured so as to be inserted subcutaneously into the vasculature in a minimally-invasive procedure.

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88. **(Currently Amended)** The intravascular pumping system of Claim ~~[[88]]~~87, wherein the pump has an average flow rate that, during normal operation thereof, is substantially below that of the patient's heart when healthy, ~~the pump.~~